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KEY TO METEOROLOGICAL RECORDS DOCUMENTATION NO. 5.11

AN ANNOTATED BIBLIOGRAPHY OF METEOROLOGICAL OBSERVATIONS IN THE UNITED STATES, 1715-1818

By James M. Havens

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at Florida State University, Tallahassee, and was supported
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WASHINGTON

ERRATA

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Observations in the United States, 1715-1818

On the Table of Contents please make the following changes:

- Item 4. The Records, Change Page Number to 4.
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AN ANNOTATED BIBLIOGRAPHY OF METEOROLOGICAL OBSERVATIONS
IN THE UNITED STATES, 1715-1818

ABSTRACT

Over eighty systematic, instrumental records have been located in American and British libraries and museums. They are described as to completeness and nature of contents. The place of deposition of the manuscripts and references to major published accounts are given where known.

1. Introduction

Analyses of long climatological series in the United States have been greatly hindered by the lack of standardized records prior to the establishment of the U.S. Signal Corps Weather Service in 1870. This deficiency has been pointed out repeatedly, perhaps most recently by Manley (15) in his efforts to extend transatlantic correlation of mean temperatures back through the 19th and 18th centuries.

This writer is of the opinion that fairly homogeneous series of climatological elements can be developed for climatologically homogeneous regions, using various records, some from as early as the Colonial Period. The prime requisite for such a venture is as complete a bibliography of meteorological observations as possible.

2. Historical sketch

In compiling the present bibliography the terminal date of 1818 was not arrived at arbitrarily. Although a directive to record meteorological observations was issued in 1814 by James Tilton, Physician and Surgeon-General of the U.S. Army, and such a journal of observations exists for the year 1816 (11), the earliest Army MS records on file at the National Archives, Washington, D.C., begin with the year 1819 (7). The first published observations, prepared under the direction of Tilton's successor, Joseph Lovell, did not appear until 1826. Records in this volume commence with 1822 (20).

From 1819 until the organization of the U.S. Signal Corps Weather Service, observations were directed by the Smithsonian Institution, beginning in 1847, and the Corps of Topographical Engineers (later by the Corps of Engineers), from 1859 to 1876. Data collected by these national agencies have been microfilmed, copies being on deposit at the National Archives, Washington, DC and the National Weather Records Center, Asheville, North Carolina. In addition to the national agencies, state departments organized networks from time to time.

3. The search for old records

The investigator must look in diverse places and under devious disguises for records prior to 1819. They comprise a collection the extent of which is impossible to delineate. For the most part weather observations were kept in personal diaries and journals by doctors, farmers, clergymen, and college professors. Such private records, of course, continue to be important after 1818.

Bibliographies, early climatologies and histories that emphasized natural subjects were searched in an effort to learn of early observations or clues thereto. A selected list of such publications is included among the references given at the end of this paper.

Over three hundred letters were sent to libraries, historical societies, museums, etc. in the East inquiring as to whether any items on deposit might be appropriate for this bibliography. The result of this inquiry is summarized in Table 1. Not infrequently it was found that libraries do not have their manuscript collections catalogued according to subject matter. These libraries are included under "Negative" in Table 1. It is certain that many useful records have thereby been overlooked.

The bibliography is limited to records that are instrumental, i.e. containing temperature and/or precipitation and/or pressure, but not exclusively wind and/or weather, and to those kept in a systematic manner, i.e. entries at least daily. A large body of descriptive weather information, frequently recorded in diaries and interleaved almanacs and potentially useful, has therefore been omitted. Ship logs and travel diaries of the period (e.g., Lewis and Clark (13)) likewise have not been included.

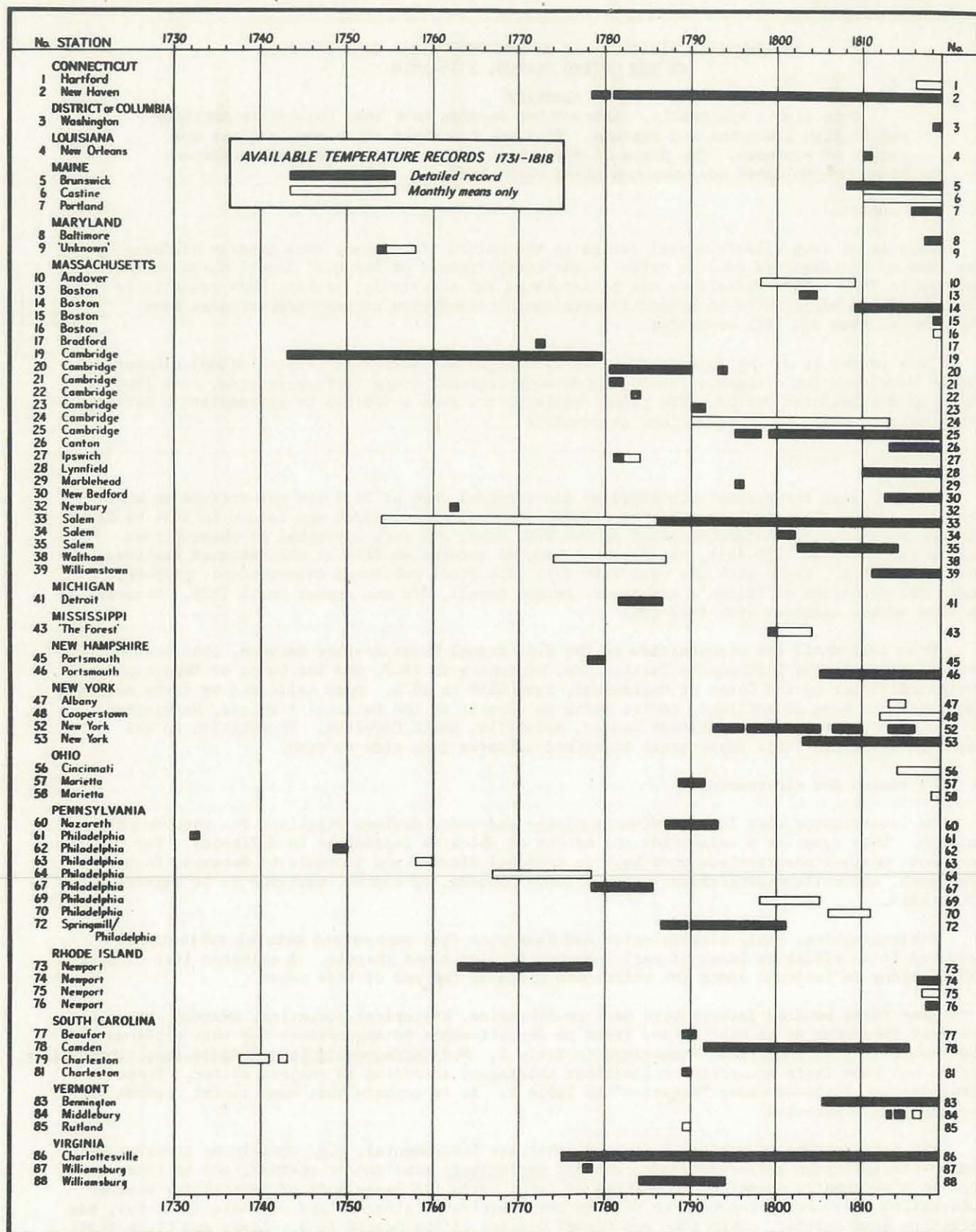


Figure 1. - Available temperature records, 1731-1818. Records of less than one year's duration not indicated.

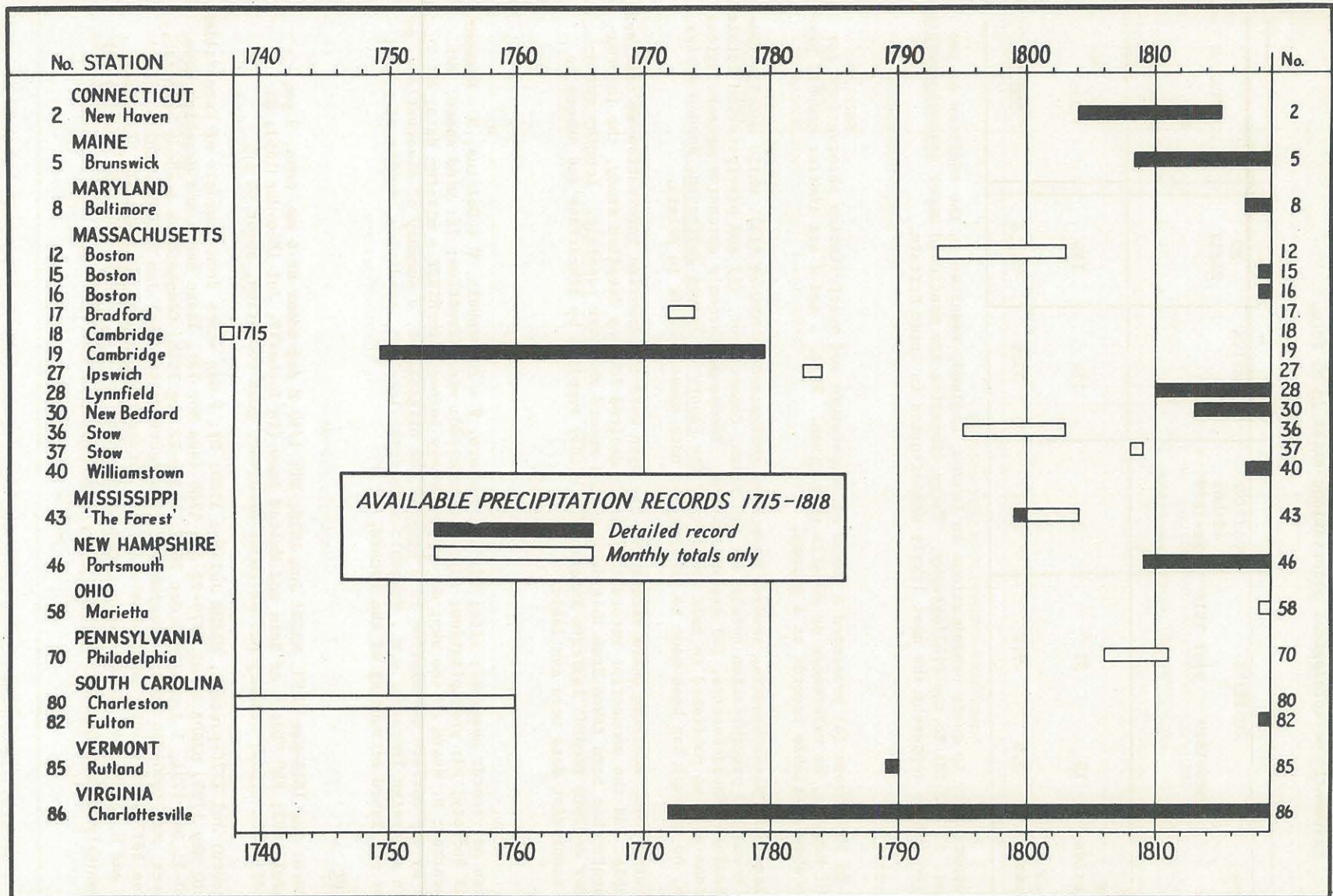


Figure 2. - Available precipitation records, 1715-1818. Records of less than one year's duration not indicated.

Table 1. Replies to questionnaire sent to depositories inquiring as to whether instrumental, systematic meteorological observations exist in MS Form.

	POSITIVE		POSITIVE either pre-1819 or post-1818	NEGATIVE	NO REPLY	TOTAL
	pre-1819	post 1818				
Number of depositories	19	31	36	114	186	336
Percent of total queried	5.6	9.2	10.7	33.9	55.4	100.0

An opportunity to query organizations in London, England, resulted in the addition of two items (Nos. 11 and 18) to the Bibliography. These libraries are mentioned under Acknowledgments and are thought to represent the most likely depositories in Great Britain.

4. The records

In 1940 Brown (4) presented a graph of temperature and precipitation observations for 1738-1838; however, no references or details were given. Figs. 1 and 2 are similar graphs, presented to show available records at a glance.

The Williamstown, Massachusetts, records have been abstracted by Milham (16), while monthly temperature means and precipitation totals for New Haven, Connecticut, (6) and precipitation totals for New Bedford, Massachusetts, (9) are well-known. Thomas Jefferson's extensive meteorological observations will be published in full as part of The Papers of Thomas Jefferson, second series. Therefore, no attempt has been made to examine and note these records in detail.

The following form, modified where necessary, has been used to summarize information, as concisely as advisable. As the manuscript record is usually desired for any detailed study, the information presented has been taken from this form of the record wherever possible. Lengthy quotations under certain records indicate information kindly supplied by librarians and others to whom the manuscript data were available.

STATE

City: dates of record; observer; site; TT: temperature, F = Fahrenheit, C = Celsius, R = Reaumur; RS = Royal Society; RR: precipitation; ppp: pressure; dd: wind direction; ff: wind speed; ww: general weather; N: state of the sky; S: supplementary information; MISDA = missing data; MS (prefixed by appropriate description if a copy of the original MS, a summary of observations, or written in a foreign language, e.g., French): manuscript location, condition, number of pages; PUB: major published account(s) of the record.

CONNECTICUT

1. Hartford: Jan 1816-Mar 1853, MISDA Jun 1816; TT: 1/10 F deg means at 6 am, noon, 9 pm, Jan 1816-Jul 1852; RR "Depth of Rain and Melted Snow (in Inches)", Jul 1846-Mar 1853; S: progress of fruit trees; summary MS: National Archives, good condition, about 44 pp.
2. New Haven: Jul 1778-present, MISDA Jul-Dec 1780; TT: F deg means from journals of Ezra Stiles, Jun 1778-10 May 1795, MISDA 4 Jul 1779-22 Jan 1780 (see No. 73), Isaac Beers and Hezekiah Howe, 1 Jan 1788-31 Dec 1791, 1 Jan 1796-8 Oct 1805, 1 Jan-22 Aug 1813, Connecticut Academy of Arts and Sciences, Mar 1800-Feb 1803, Jeremiah Day, (Connecticut Academy) Jan 1804-Dec 1820, John Hall, 1 Jan 1817-28 Dec 1852; MS journals at Yale University Library; PUB: Monthly TT means, Loomis E. and H. A. Newton, 1866, Trans. Conn. Acad. Arts Sci., 1, Pt. 1, 194-246; Clayton (6) 883-887; monthly RR totals, Jan 1804-Dec 1821, Goodnough (9), 410.

DISTRICT OF COLUMBIA

3. Washington: Jan 1818-May 1825; John Quincy Adams; Daily TT and ww; FIIM: JQA Miscellany 54, Massachusetts Historical Society; MS: 95 pp.

LOUISIANA

4. New Orleans: 1 Jan-31 Dec 1810; Lafond: TT: 1/2F deg, usually 7 am, noon, 4 pm, 11 pm, but greatly variable and not always so complete; ppp: 1/1000 inch at time of TT obs; dd: 8-pt compass at time of TT obs; ww: brief description at time of TT obs; evaporation noted qualitatively; French MS: National Archives, fair condition, script difficult to read, figures clear, about 730 pp (2 pp/day).

MAINE

5. Brunswick: 1 Nov 1807-31 Dec 1859, MISDA 1853, and other, shorter periods; Parker Cleaveland; Bowdoin College; TT: 1/10 F deg daily means from obs at 7 am, 1 pm, 6 pm; RR: monthly totals, Apr 1808-Dec 1859, MISDA 1824-1838, and other, shorter periods; ppp: 1/10 inch, monthly extremes, from obs at time of TT; dd: 8-pt compass summary from obs at time of TT; above taken from published account; MS: Bowdoin College Library; PUB: Schott, C.A., 1867, Smithson. Contr. Knowl., 16, publication 204, 53 pp; monthly RR totals, Goodnough (9), 276-277.
6. Castine: Jan 1810-Dec 1849; "An abstract of the average temperature of each month in the year for 40 years (from Jan 1, 1810 to Dec 31, 1849) copied from a journal kept in Castine, Maine, by Job Nelson, Esq..... Probate for the County of Hancock"; TT: 1/100 F deg means; summary MS: "copied by Joseph L. Stevens, M.D." (but crossed out): National Archives, fair condition, 1 p; also, "An abstract of a Meteorological Register, showing the maximum and minimum Temperature of every month from 1810 to 1850, copied from a Journal kept by Judge Nelson.."; a summary MS: National Archives, good condition, 4 pp.
7. Portland: Jan 1816-1843; Lemuel Moody; Portland Observatory; "Thermometrical record.."; MS: Maine Historical Society.

MARYLAND

8. Baltimore: Jan 1817-Dec 1824, Jun, Sep-Dec 1829; Lewis Brantz: "in the vicinity of Baltimore"; TT: whole F deg at sunrise, 2 pm, 10 pm, RR: 1/10 inch monthly totals, "water fallen by rain"; ppp: 1/100 inch at time of TT obs; dd: 8-pt compass, one or two entries per day; ww: "clear", "very pleasant", "snow in night", "strong breeze", etc., at least one entry per day; PUB: privately by Brantz, 1818, 1819, 1822, 1823 (MISDA Mar), Jun, Sep-Dec 1829 at National Archives; TT means, Jan 1817-Dec 1824, Blodget (3), 70.
9. "Unknown": Sep 1753-Dec 1757; Richard Brooke; TT: whole F deg, mercurial thermometer, am and pm, 1 Sep 1753-31 Aug 1754, "highest" and "lowest" by months, Sep 1754-Dec 1757; dd: 8-pt compass at time of TT obs, 1 Sep 1753-31 Aug 1754; ww: "Fair and calm", "Rained. Snowed", "Flying clouds", etc., at time of TT obs, 1 Sep 1753-31 Aug 1754, general summaries by months Sep 1754-Dec 1757; PUB: Phil. Trans., 1759, 51, 58-82.

MASSACHUSETTS

10. Andover: Jan 1798-Dec 1808; Jonathan French; south parish; TT: 1/10 F deg means at "sunrise", "warmest pt. of day", "sundown"; dd: 8-pt compass, number of days during morning, noon, evening; ww: number of days during morning, noon, night under "fair", "cloudy", "wet"; additional summaries; PUB: Mem. Amer. Acad. Arts Sci., 1815, 3, Pt. 2, 399-412; monthly RR totals, Jan 1782-Dec 1786, 1793, 1798, 1800, 1803, Goodnough (9), 323.
11. Boston: 26 Jan 1725-31 Mar 1726 (O.S.); "Mr. Feveryear"; ppp: 1/10 inch usually at least twice a day, hour varies; dd: 16-pt compass at time of ppp obs; ww: "a Smal Shower Hot", "Misty", "Rain", etc. at time of ppp obs; MS: The Royal Society, London, excellent condition, 23 pp.
12. Boston: Jan 1792-Dec 1802; Joseph Barrell; Charlestown, RR: monthly totals; number of "snows" per season, 1786-1802; PUB: Mem. Amer. Acad. Arts Sci., 1809, 3, Pt. 1, 104-106; Goodnough (9), 329.

13. Boston: 24 Jul 1802-21 Jul 1804; School Street; "entered on an unbound printed form entitled 'The Naturalist's Journal'. Contains temperature, 4 times daily, at 8 am, 12 noon, 4 and 8 pm; direction of winds from November 27, 1803-July 21, 1804; and general daily descriptions of the weather."; MS: American Academy of Arts and Sciences.
14. Boston (uncertain): 1 Jan 1809-12 May 1820 with MISDA: Samuel Hurd Halley; TT: whole F deg, time varies, usually 7 am, 2 or 3 pm (omitted after Mar 1815), 8 or 9 pm (usually omitted after 1 Oct 1811); in pencil after June 1813; MS: Boston Athenaeum, fair condition, in 4 small booklets, 58, 22, 33, 24 pp.
15. Boston, Springfield, Gardiner (at different dates): 1 Jan 1818-17 January 1829; 2 Jan 1831-3 Jan 1835; "Contains usually three temperature readings each day, at sunrise, 1 pm and 10 pm, both in yard and roof of house; some of the time amounts of rain and snow; course and strength of wind; face of the sky (clear, cloudy, etc.); and remarks; and most of the time maxima and minima temperatures."; MS: American Academy of Arts and Sciences, 8 vols.
16. Boston: Jan 1818-Dec 1848; Enoch Hale; 12 Franklin Street; "Contains monthly and annual temperature means at sunrise, 1 and 10 P.M.; monthly and annual summaries and means of amounts of precipitation; number of days of storm, entirely fair, some parts fair; monthly maxima and minima of temperature; monthly range of temperature: distribution of direction of winds, monthly at sunrise, and 10 P.M.; summary of days, monthly, with fair and cloudy weather, rain and snow at sunrise, 1 and 10 P.M. Contains also daily temperatures, sunrise and 1 and 10 P.M.; amounts of rain and snow; general remarks; direction and strength of winds at sunrise, 1 and 10 P.M.; face of the sky and clouds at sunrise, 1 and 10 P.M., with occasional specific description, cirrostratus, etc.; and monthly summaries and means of the above; beginning with December, 1818, barometer readings at sunrise, 1 and 10 P.M."; MS: American Academy of Arts and Sciences, 3 vols and 12 pamphlets; PUB: monthly RR totals, 1818-1822 (Hale), 1823-1865 (Hall), 1866-1913 (others), Goodnough (9), 326-327.
17. Bradford: 1 Jan 1772-Dec 1773; Samuel Williams; TT: 1/2 F deg at 6 am, noon, 9 pm, 1 Jan-31 Dec 1772; RR: monthly totals, Jan 1772-Dec 1773; ppp: nearest 1/1000 inch at time of TT obs, 1 Jan-31 Dec 1772; dd: 8-pt compass, one or two entries per day, 1 Jan-31-Dec 1772; ff "little", "fresh", "strong", etc, 1 Jan-31 Dec 1772; ww: "small showers A.M. fair and pleas. P.M.", "Cloudy, dull weather", "Storm of snow, all day; bright evening", etc, one entry per day, 1 Jan-31 Dec 1772; description of instruments; PUB: Trans. Amer. phil. Soc., 1786, 2 (o.s.), 118-141.
18. Cambridge: Jan-Dec 1715 (O.S.); Thomas Robie; Harvard College; RR: monthly totals, 1/100 pounds; dd: 16-pt compass on first day of each month only; ww: at time of dd obs; PUB: Derham, W., 1732, Phil. Trans., 37, 262-263.
19. Cambridge: Vol I: 11 Dec 1742-31 Dec 1759 with MISDA, Vol II; 1 Jan 1760-28 Apr 1779 with MISDA: John Winthrop; TT: 1/10 RS deg (Hauksbee), 1/2 F deg, frequently simultaneous obs, morning (generally between 8 and 10) and evening (generally between 4 and 7), means computed at end of each month and year; RR: 1/1000 inch, 4 Aug 1749-28 Apr 1779, monthly totals at end of year; ppp: 1/100 inch at time of TT obs, means at end of month and year; dd: 16-pt compass at time of TT obs; ff: 0 (calm), 1, 2, 3 at time of TT obs; year summary for 1757 missing; Vol III: all calculations of means and comparisons of Hauksbee and Fahrenheit readings; MS: Harvard University Archives, good condition, Vol I: about 350 pp, Vol II: about 375 pp; PUB: monthly RR totals 1749-1779 with MISDA, Goodnough (9), 332.
20. Cambridge: 18 Jun 1780-31 Dec 1789, 1793; Edward Wigglesworth; "Contains 3 daily readings of barometer and thermometer; directions of winds; general comments; monthly summaries and means of barometer readings; temperatures; winds; and states of the sky; also summary of precipitation, temperatures and winds for Virginia, 1772-1777"; MS: American Academy of Arts and Sciences, 1 vol; PUB: abstract June 1780-Dec 1783 (MISDA Oct 1781, Mar-Jul 1782), Mem. Amer. Acad. Arts Sci., 1785, 1 (o.s.), 334-335.
21. Cambridge: 20 May 1780-Dec 1781; Edward Wigglesworth; "Contains barometer, thermometer readings three times daily; direction of winds; general comments; maxima, minima and means of barometer and thermometer readings, monthly." MS: American Academy of Arts and Sciences.

22. Cambridge: Nov 1782-Oct 1783; Caleb Gannett; "Contains thermometer, barometer and hygrometer readings three times daily; direction of winds; and general comments."; MS: American Academy of Arts and Sciences.
23. Cambridge: 1 Jan 1790-4 Oct 1791; Samuel Williams (see Rutland, Vt.); TT: whole F deg, 3 obs per day, times not noted, means computed in a few cases; 8-pt compass at time of TT obs; ff: numbers 1, 2 or 3 at time of TT obs; dd: ww: symbols such as \oplus , \ominus , \odot , etc; N: symbols such as \odot , II, \odot , = at time of TT obs; MS: Harvard University Archives, fair condition, legible, about 72 written pp.
24. Cambridge: Jan 1790-Dec 1812; Samuel Webber, Jan 1790-Jun 1807; John Farrar, Jun 1807-Dec 1812; TT: "Greatest", "Means", "Least" 1/10 F deg (reduced from R deg, Jan 1790-Aug 1795) at 7 am, 2 pm, 9 pm; ppp: 1/100 inch means (French Units, Jan 1790-Jul 1802) at time of TT obs (MISDA Sep 1803-Dec 1804, Sep 1808); dd: 8-pt compass, number of days during morning, noon night, Jan 1791-Dec 1812 (MISDA Jan-Dec 1804, Jul-Dec 1807, Sep 1808); N: number of days during morning, noon, night under "fair", "mostly fa.", "cloudy", "mostly cl." Jan 1791-Dec 1812 (MISDA same as dd); additional summaries; PUB: Mem. Amer. Acad. Arts Sci., 1815, 3, Pt. 2, 361-398; monthly TT means of above plus 1813, 1816, 1817, American Almanac, 1837, 176.
25. Cambridge: Vol. I; 1 Jan 1795-20 Dec 1797, Vol. II: 17 Nov 1798-31 Dec 1816, Vol. III: 1 Jan 1817-31 Dec 1829 (MISDA 13 Mar-7 Aug 1817); Abiel Holmes; TT: whole F deg with different thermometers, usually winter 8 am, 2 pm, 10 pm, summer 7 am, 2 pm, 10 pm, often more frequently; dd: 8-pt compass, usually at time of TT obs; ww: "fair", "rain", "cloudy", etc., usually at time of TT obs, very few longer notes; MS: Library of Congress, good condition, but difficult to read in places, Vol I: about 74 pp, Vol II: about 144 pp, Vol III: about 194 pp.
26. Canton: 1 Feb 1813-16 Jul 1819, 30 Dec 1819-7 Mar 1827, 21 Jan 1831-5 Jan 1883, 11 Jan 1883-5 Apr 1886; James A Bazin, Wallace Stevens beginning 11 Jan 1883, Ponkapoag Village; TT: whole F deg, hour specified until 15 Jan 1820, then sunrise, noon, sunset, not always complete, beginning, 1 Jan 1841 "SR", "1", "SS", "10"; ww: "fair", "rain", etc., two or three entries per day; MS: Blue Hill Observatory, 54 small, bound booklets, each containing about 25 pp; PUB: record beginning Jul 1831 "used with a few years from Milton Center to give a complete (temperature) series adjusted to Blue Hill from that date", to be published in World Weather Records, 1941-1950.
27. Ipswich: 1 Jan 1781-Dec 1783; Manasseh Cutler; TT: whole F deg usually at 8 am, 1 pm, 10 pm, but time varies, 1 Jan-31 Dec 1781, highest, lowest, mean for "A.M.", "noon", "P.M.", Jan 1782-Dec 1783; RR: monthly totals, 1/1000 inch, Sep 1782-Dec 1783; ppp: 1/100 inch at time of TT obs; dd: 16-pt compass, one or two entries per day, 1 Jan-31 Dec 1781, summarized Jan 1782-Dec 1783; ww: one or two entries per day, 1 Jan-31 Dec 1781, summarized Jan 1782-Dec 1783; exposure and description of instruments given; only 1781 presented in detail; PUB: Mem. Amer. Acad. Arts Sci., 1785, 1 (o.s.), 336-371; monthly RR totals, Goodnough (9), 349.
28. Lynnfield: 1 Jan 1810-28 Jul 1879; Josiah Newhall; TT: 1/2 F deg. hour not given; RR: 1/10 inch, recorded after rainfall; ppp: 1/10 inch at time of TT obs, 1 Jan 1855-28 Jul 1879; dd: 8-pt compass at time of TT obs, 1 Jan 1838-28 Jul 1879; ww: "Clear", "Some snow and rain, thunder and lightning", "Good sleighing", etc. at time of TT obs; MS: Essex Institute, good condition, about 400 pp in small books, 800 pp in large books; monthly RR totals, Jan 1842-Dec 1878, Goodnough (9), 360-361.
29. Marblehead (probably): 1795; Isaac Story; "Contains temperature readings at sunrise, noon and 10 P.M."; MS: American Academy of Arts and Sciences.
30. New Bedford: 11 Aug 1812-1905; Samuel Rodman and Thomas R. Rodman; TT; RR; ppp; dd; ww; MS: Blue Hill, good condition; PUB: monthly TT means, Jan 1813-Jun 1856, Blodget (3), 69; monthly RR totals, Jan 1814-Dec 1913 (Rodman and others), Goodnough (9), 365-366.
31. New Bedford: Oct 1812-Dec 1848; Samuel Rodman; ppp: "Barometric Means and Extremes..." at "Sunrise", 2 pm, "Sun Set", 10 pm, 1/100 inch; dd: number of days under "N and NW", "W and SW", etc, one ob per day, Jan 1818-Dec 1833; ww: "Ap. Atmos.", number of days under "Fair", "Cloudy", "Rain", "Snow"; a summary MS: National Archives, good condition, 18 pp.

32. Newbury: 1 Jan-31 Dec 1762; John Lowell; TT: 1/2 RS deg (Hauksbee), one entry per day, "... taken in the Morning, and if in Winter the Cold, or in Summer the heat increases the same Day, the Alterations noted in the Weather Column.", summary of number of days per month with temperatures 80 RS deg or "lower"; ppp: 1/10 inch; dd: 16-pt compass, one entry per day; ww: general character of day, "snow all day", "cloudy", "Fair M. Sm. sprinkling of rain at noon. Cloudy. ; accompanying letter from R.T. Paine to John A. Lowell concerning the record; MS: Boston Athenaeum, fair condition, sometimes difficult to read script, 15 pp.

33. Salem: Jan 1754-1 Mar 1829; Edward Augustus Holyoke; "Contains description of thermometer; general summaries of weather 1754-1785; then tables of temperature (generally indoors); general descriptions of weather; occasional direction of winds, until April 1754, when daily direction of winds noted. Beginning with 1786, Dr. Holyoke's journal becomes more detailed. He uses a group of symbols to describe the nature of the weather--fog, calm, rain, etc. The journal now contains, in addition to the symbols, barometer readings at 8 A.M. and 10 P.M.; temperature readings at 9 A.M., 4 and 10 P.M., both inside and outside, as well as occasional comments and the direction and strength of the winds. His observations include rainbows, haloes, and parhelia."; MS: American Academy of Arts and Sciences, 4 vols; PUB: Mem. Amer. Acad. Arts Sci., 1833, 1 (N.S.), 107-216.

34. Salem: Dec 1800-Jan 1802, Samuel Rantoul; "Contains daily thermometer readings at 8 A.M., 12 M., 3 and 5 P.M.; direction and strength of wind; and general comments on the weather; also a table of the monthly average height of the mercury in Fahrenheit thermometer for the four different hours and the combined average of those hours."; MS: American Academy of Arts and Sciences.

35. Salem: Vol I: 16 March 1802-10 May 1804 with MISDA, Vol II: Jan-Dec 1803 (monthly means only), year 1804 in interleaved almanac, Vol III: 11 May 1804-31 Dec 1808, Vol IV: 1 Jan 1809-31 Dec 1813; William Bentley; TT: whole F deg Vol I; "9.", "0.", "3.", also frequently "sunrise", Vol II: "sunrise", "12.", "3 P.M.", "10 evening", Vol III: "M", "xii", "iii", "E", Vol IV: "Fm", "xii", "iii", "E" with monthly means computed in different hand; ppp: 1/10 inch at "Bm" and "Be" in Vols III and IV; dd: 16-pt compass, occasional entries, one per day in Vol. II, one entry per day in Vol III, one or two entries per day in Vol IV; ww: general character of day, occasional brief entries in Vol II, "changeable", "drizzling", "heavy frost", etc. in Vols III and IV; MS Vols I and II: American Antiquarian Society, good condition. Vol III; American Antiquarian Society, good condition, numbered pages 1-57 and 381-433, Vol IV: Blue Hill, good condition, 120 pp.

36. Stow: 1792-Dec 1803; Jonathan Newell; RR: annual totals, 1792-1794; monthly totals, Jan 1795-Dec 1803; PUB: Mem. Amer. Acad. Arts Sci., 1809, 3, Pt. 1, 122; Goodnough (9), 380.

37. Stow: "The amount of water that fell ... from January, 1808-December, 1808."; MS: American Academy of Arts and Sciences.

38. Waltham: 1774-1786; Jacob Cushing; "...monthly maxima and minima temperatures; direction of winds; number of days in month fair, cloudy, with rain, snow, hail, fog, thunder, frost; also general comments."; a summary MS: American Academy of Arts and Sciences.

39. Williamstown: 1 Jan 1811-31 Dec 1838; "Thermometrical Tables Deduced from Observations made at Williamstown, Mass ... by Edw. W. Morley"; Chester Dewey, observer to 1826; Williams College; at least three F thermometers, changes in exposure, obs: 7 am, 2 pm, 9 pm, may vary during early period, mean TT each day; also contains short history of observations at Williams College; a summary MS in form for publication: National Archives, fair condition, 41 pp; original MS: Williams College Library; PUB: extension of above, mainly monthly TT means, Jan 1811-Mar 1948 with MISDA and monthly RR totals, Jan 1816-Mar 1948 with MISDA, Milham (16).

40. Williamstown: 1816-1822; Chester Dewey; Williams College; "Contains monthly temperatures, maxima and minima; direction and strength of winds; tables of precipitation in relation to phases of the moon; mean temperatures."; a summary MS: American Academy of Arts and Sciences..

MICHIGAN

41. Detroit: 1 Aug 1781-31 May 1786; George Christian Anthon; "A daily record, morning, noon and evening of temperature; winds; weather conditions ..."; MS: New York Historical Society, 30 pp.

42. Detroit: Oct 1792-May 1793; "Contains 3 or 4 temperature readings a day plus general comments."; MS: American Academy of Arts and Sciences.

MISSISSIPPI

43. "The Forest": 1 Feb 1799-Dec 1803; William Dunbar; "... four and a half miles east of the river Mississippi in North Lat. 30°28' and Long. 91°30' West of Greenwich..."; TT: 1/2 F deg at 6 am, 3 pm, 9 pm, 1 Feb 1799-31 Jan 1800; "greatest", "lowest", "mean" heights by months, Jan 1800-Dec 1803 (MISDA Jan-May 1803); RR: 1/100 inch, 1 Feb 1799-31 Jan 1800; monthly totals, Jan 1800-Dec 1803; ppp: 1/100 inch at time of TT obs, 1 Feb 1799-31 Jan 1800; "Greatest", "Lowest", "Mean" heights, Jan 1800-Dec 1803; dd: 8-pt compass at time of TT obs, 1 Feb 1799-31 Jan 1800; ff: calm, 1 ("light Zephyr"), 2 ("brisk breeze"), 3 ("very strong wind"), 4 ("tempest or hurricane") at time of TT obs, 1 Feb 1799-31 Jan 1800; ww: "Drizzly", "Some wh. clds. nr. hor.", "Small sleet or snow", etc., 1 Feb 1799-31 Jan 1800; description and location of instruments; PUB: Trans. Amer. phil. Soc., 1809, 6 (n.s.), 9-23, 43-55, 188-189.

44. Gloster Place: 1-31 Dec 1811; Gov. Sargent; TT: whole F deg at sunrise, 2 pm, sunset; RR: "in 225 parts of an inch"; ppp: nearest 1/100 inch at time of TT obs; ww: "Fair -light, variable winds", "Cloudy and calm", etc., at least one entry per day; PUB: Mem. Amer. Acad. Arts Sci., 1815, 3, Pt. 2, 358-360.

NEW HAMPSHIRE

45. Portsmouth: Mar 1778-Feb 1780; D. Cutler; "Contains daily thermometer readings at sunrise, noon and sunset."; MS: American Academy of Arts and Sciences.

46. Epping, Concord, Portsmouth, and other places: 1 Jan 1796-31 Dec 1823; William Plumer; TT: whole F deg usually at 6 am, 1 pm, 9 pm, 1 Dec 1804-31 Dec 1823, means computed in "Appendix"; RR: 1/100 inch beginning 13 Jan 1809, depth of snow (unmelted) usually noted, snow totals in "Appendix"; dd: 8-pt compass, one or two entries per day, summarized in "Appendix"; ww: general character of day, "Cloudy -- very little snow", "fair", etc.; MS: Blue Hill Observatory, good condition, 634 pp.

NEW YORK

47. Albany: Jan 1813-Dec 1814; TT: 1/10 F deg means from obs at 7 am, 3 pm, 9 pm; PUB: Clayton (6), 808.

48. Cooperstown: 1812-1818 with MISDA; Isaac Cooper; TT: whole F deg at 9 am, 12 M, 3 PM, 9 pm; ww: "cloudy", "fair", "rain", etc. at time of TT obs; MS: New York State Historical Association.

49. Huntington: 1807-1824; "Record of Highest Temperature in Huntington-- in the open and shade."; a summary MS: Huntington Historical Society.

50. Malone: Jan-Feb 1812; George F. Harrison; TT: whole F deg at "sunrise", "midday", "sunset", "midnight" (beginning 15 Jan); ww: "fair", "rain", "snow" at time of TT obs, a few more detailed notes; MS: National Archives, good condition, in New York copy MS (No. 49 below), Vol II.

51. Monticello: 1 Sep 1810-14 Jun 1811 with considerable MISDA; TT: whole F deg at 7 am, 2 pm, 9 pm; dd: 8-pt compass at time of TT obs; ww: "cloudy", "rain", etc. at time of TT obs, also a few notes; MS: National Archives, good condition, in New York copy MS (No. 49 below), Vol II.

52. New York: Vol I: 1 Aug 1792-4 Nov 1795, Vol II: 1 Jul 1796-30 Nov 1804, Vol III: 1 Aug 1806-31 Dec 1809, Vol IV: 1 Jan 1813-31 Dec 1815; "New York Insurance Office: site varies: Corleans Hook, Greenwich St., Cortlandt St., No. 11 Robinson St.; TT: very seldom entered in Vol I, periods of MISDA in Vol II, complete in Vols III and IV, all obs usually 7 or 8 am, 3 pm, 8 or 10 pm; dd: 8-pt compass, at time of TT obs; ww: "dull", "clear", "cloudy", "rain", etc. at time of TT obs; a few social and political notes; MS: National Archives Vol I: poor condition, but legible, about 76 pp, Vol II: good condition, about 197 pp, Vol III: fair condition, about 80 pp, Vol IV: fair condition, about 72 pp; also, a copy MS of above: Vol I: 9 Dec 1788-31 Aug 1813, MISDA 3 Feb 1796-30 Nov 1804, Vol II: 1 Sep 1813-31 Dec 1815, both vols in better condition than original MS.

53. New York: 3 Jan 1803-29 Sep 1827, Sun obs frequently missing, Feb 1815 rather incomplete; TT: whole F deg at "M", "N", "E" ("E" omitted 1 Sep 1813-31 Aug 1818); dd: 8-pt compass at time of TT obs; ww: "clear", "snow", "dull", "Heavy Fog", etc. at time of TT obs (omitted 1 Jul 1821-30 Sep 1822), occasionally more detailed remarks; social and political notes; MS: National Archives, good condition, about 300 pp.

54. Pultneyville; 1 Apr-14 Jun 1811, 4-31 Dec 1811, 1 Jan-15 Sep 1812 with MISDA: TT: whole F deg at "sunrise", 1 pm, 10 pm; dd: 8-pt compass at time of TT obs; ww: "clear", "pt. cl.", "cloudy" or hydrometeor at time of TT Obs; phases of moon, social and political notes; MS: National Archives, poor condition, but generally legible, about 26 pp; also, in New York copy MS (No. 52 above), Vol. II.

OHIO

55. Cincinnati: 1 Jun 1790-14 Apr 1791; Daniel Britt and G. Turner; Fort Washington; "... on the Ohio, N. Lat. 39° 3' 5\".

56. Cincinnati: Jan 1814-Dec 1848; J.H. Jackson; Farmers College, College Hill, TT: whole F deg means at "sunrise". "noon", "sunset", also "highest thermometer", "lowest thermometer"; dd: 8-pt compass, number of days; ww: number of days under "clear", "cloudy", "rain", "snow", and usually "Th.", "fog", "hail"; frosts, storms, crops, etc. under "General Remarks"; summary MS: National Archives, good condition, script sometimes difficult to read, figures clear, about 35 written pages in ledger.

57. Marietta: 1 Sep 1788-31 May 1791; W. Sargent; "Observations with Fahrenheit Thermometer at the sun's rising, setting and 2 o'clock P.M...Contains temperature readings, strength and direction of winds and general comments."; MS: American Academy of Arts and Sciences.

58. Marietta: Nov 1817-Sep 1823; Joseph Wood; U.S. Land Office; PUB: monthly TT means from obs at sunrise, 2 pm, sunset, Jun 1818-Mar 1823; monthly RR totals and frequencies, Nov 1817-Sep 1823; PUB: Schott, C.A., 1867, Smithson. Contr. Knowl., 16, publication 120, 46 pp.

PENNSYLVANIA

59. Lancaster: 1811-1829; within one mile of Lancaster; RR: 1/100 inch yearly totals; PUB: Hazard (10), 79.

60. Nazareth: 1 Jan 1787-31 Dec 1792; "Meteorological Journal began 1787, C.G. Reichel .."; probably at Nazareth Hall Boarding School for Boys; TT: 1/2 F deg at 7 am, 2 pm, later "M.", "A.", then "a.m.", "p.m.", monthly mean usually marked in pencil; ppp: 1/100 inch at time of obs, 18 Feb-31 Aug 1792, 28 Oct-31 Dec 1792; dd: 8-pt compass, one or two entries per day; ff: indicated by 0, 1, or 2; hygrometer entries under "moist" or "dry", 1/2 unit, 1 Aug 1789-31 Dec 1792; ww: occasional entries "foggy", "rain in the night", "fell snow about 4 inches"; N: "clear and cloudy", either clear 1, 2, or 3 or cloudy 1, 2, or 3, at time of TT obs; MS: National Archives, good condition, last month in different hand, 82 pp.

61. Philadelphia: 18 Nov 1731-28 Oct 1732 (O.S.); "Mr. de S."; Germantown; TT: 1/4 deg on medium-type F thermometer in morning and afternoon; description and exposure of thermometer; PUB: Miscellanea Berolinensia, 1737, 5, 123-131.

62. Philadelphia (and vicinity): 1 Aug 1748-11 Jan 1750; Pehr Kalm (1 Jun-8 Oct 1749 by John Bartram); site varies; TT: 1/10 C deg, usually one morning and one evening ob, hour varies; dd: 16-pt compass at time of TT obs; ff: on scale of 0 to 4 at time of TT obs; ww: "The Weather in General": "Fair", "Rain at night", "Alternately fair and cloudy", etc. usually at time of TT obs; MS: record at American Philosophical Society may be by Kalm and/or Bartram; PUB: Benson (1), 738-769; abstract of monthly TT means, Oct 1748-Sep 1749, Blodget (3), 70.

63. Philadelphia: Jan 1758-Dec 1759; MS: American Philosophical Society; PUB: abstract of "Greatest Heat", "Least Heat", and "Mean Heat" by months in Trans. Amer. phil. Soc., 1839, 6 (n.s.), 395; also, New American Magazine, 1758, several issues, Blodget (3), 70.
64. Philadelphia: Jan 1767-May 1778; MS: American Philosophical Society; PUB: Jan 1767-Dec 1777 abstract, "Greatest Heat", "Least Heat", and "Mean Heat" by months in Trans. Amer. phil. Soc., 1839, 6 (n.s.), 395-396; monthly TT means, Blodget (3), 70
65. Philadelphia: 1 Dec 1770-15 Feb 1771; Thomas Coombe; TT: 1/2 F deg at 9 am and 2 pm, open air and indoors; ppp; 1/100 inch at time of TT obs; dd: 8-pt compass at time of TT obs; ww: "fair", "snow", "clou.", "Smart frost in the night", etc. at time of TT obs; information on make and exposure of thermometers; PUB: Trans. Amer. phil. Soc., 1769-1771, 1 (o.s.), 70-72 (appendix).
66. Philadelphia: 1772-1791, with MISDA; James Gibbons; weather record kept in school account book; MS: Pennsylvania Historical Society.
67. Philadelphia: 25 Sep 1778-23 Jul 1792, 8 Aug 1792-30 Sep 1805; David Rittenhouse; TT; ppp; dd usually twice daily; MS: Pennsylvania Historical Society.
68. Philadelphia: Jun and Jul 1793-1809; TT: monthly means; MS: letter from Cadwalader Evans to Benjamin Rush, 21 Jul 1809, Library Company of Philadelphia, 1 sheet.
69. Philadelphia: Jan 1798-Dec 1804; Cox; PUB: monthly TT means, Blodget (3), 70.
70. Philadelphia: 1806-1810; A. Fothergill; "Meteorological observations of the climate of Philadelphia..."; MS: Library of the College of Physicians, Philadelphia.
71. Pittsburgh: Jan 1788; Fort Franklin: Nov 1787-Feb 1788; Venango: Jan 1788; various observers; TT: F deg generally at sunrise, noon, sunset; hygrometer readings at time of TT obs; MS: letters from Nathaniel Bedford, Pittsburgh, to Benjamin Rush, 1788-1789, Library Company of Philadelphia.
72. Springmill: 1 Oct 1786-31 Aug 1789; Philadelphia: 1 Feb 1790-1800; Peter Le Gaux; TT: 1/10 F and R deg means for day, simultaneous obs; RR: "Water of Rain or Snow, in.pts. 1/10", 1 Apr-31 Aug 1789; ppp: "in. pts. 1/10 inch", "mean height" for day; dd: 16-pt compass, "prevailing" for day; ww: "overcast, damp, and fair", "fog", "white frost", etc. one entry per day; summary of mean and totals included in published tables; MS: American Philosophical Society, 1787-1800; PUB: The Columbian Magazine or Universal Asylum, Nov 1786-Dec 1792, terminal dates of magazine; tables missing William L. Clements Library copies of Jul, Sep 1787 and Jan 1788; description of instruments and time of obs in "Note" by Le Gaux, Mar 1789 issue.

RHODE ISLAND

73. Newport: 1 Jan 1763-Jun 1778; Ezra Stiles (see No. 2); TT: 1/2 F deg, time varies; dd: 8-pt compass at time of TT obs; ww: "Cloudy", "Rain, High Wind", "Thund.", etc. usually at time of TT obs; MS: Yale University Library.
74. Newport: Vol I: 1 Sep 1816-22 Jul 1822, Vol II: 1 Nov 1828-31 Dec 1835, Vol III: 1 Jan 1836-31 Jan 1854, Vol IV: 1 Jan 1855-24 May 1862; James Taylor and others; corner of Thames and Mary Streets; TT: whole F deg at "sunrise", 2 pm, "sunset"; dd: 16-pt compass at time of TT obs; ww: "cloudy", "Foggy", "Snow", etc. at time of TT obs, also "Night" obs; MS: Newport Historical Society, Vol I: 72 pp. in ledger, Vol. II: about 90 pp, Vol III: handwriting difficult to read, about 200 pp, Vol IV: about 40 pp.
75. Newport: Oct 1816-Dec 1846; "Meteorological Data ... 1817 to 1846"; TT: whole F deg means Oct 1816-Dec 1846, in tabular form Jan 1817-Dec 1846; RR: "Table showing Rainfall and Melted Snows" Jan 1836-Nov 1841, May-Jul 1842, 1/100 inch; dd: 8-pt compass, by months; ww: brief notes Oct 1816-Dec 1820; a summary MS: National Archives, good condition, 12 pp.

76. Newport: 8 Oct 1817-23 Oct 1818; David Melville; Newport Light House; TT: whole F deg at 9 am, 4 pm; dd: 8-pt compass at time of TT obs; ww: "cloudy", "clear", "rain", etc. at time of TT obs; MS: Newport Historical Society, good condition, about 48 pp.

SOUTH CAROLINA

77. Beaufort: 24 Nov 1788-30 Jun 1790; Belcher Noyes; "Contains thermometer readings at 7 A.M., 2 and 9 P.M.; barometer readings at 2 P.M.; direction of winds one to three times a day, usually three; general comments on the weather; highest and lowest readings of the thermometer and means; .."; MS: American Academy of Arts and Sciences.

78. Camden: 30 May 1791-13 Aug 1802 on Magazine Hill, 13 Aug 1808-16 Jul 1815 at Malvern, S.C., both periods contain MISDA: James Kershaw; TT: whole F deg at 8 am, noon, 10 pm, varies, TT means by months computed; dd: 8-pt compass, one or two entries per day; ww: occasional entries of "fog", "frost", "hard rain at night", etc; N: "cloudy", "pt. cl.", "clear", one entry per day; copy and summary MS: National Archives, good condition; also, "The James Kershaw Meteorological Records at Camden, South Carolina", 20 Jul 1917, typescript by R. H. Sullivan; present location of Kershaw diary unknown, all data copied in pencil by R.H.S.

79. Charleston: Apr 1737-Dec 1748; John Lining; TT: whole F deg means for 1738, 1739, 1740, 1742, also extremes, obs: "in heat of the day" and "about 10 p.m."; RR: "A table of the depth of Rain, in Inches and Millesimal parts in Charles Town", Jan 1738-Dec 1748; ppp: "greatest altitude" and "least altitude", Apr 1737-Dec 1740, obs: "noon", "night"; dd: "A Table of Winds", 16-pt compass, number of obs for one year (n.d.), at "morning", "2 p.m.", "bedtime"; a copy and summary MS: Library of Congress, good condition, ff. 545-555 of "Copy of the Answers of James Glen Esquire Govr. of South Carolina to the Queries proposed by the Lords of Trade. 1749.", Transcripts, Kings Manuscripts 205, ff. 212-end (ff. 279-304 in British Museum copy); PUB: Phil. Trans., 1748, 45, 336-344; "...Account of the Instruments...used, and their Situation...published in Phil. Trans., No. 470, p. 497-8."; monthly TT means, Blodget (3), 71.

80. Charleston: Jan 1738-Dec 1759; various observers; RR: "Rain at Charleston, S.C." to 1/1000 inch; summary MS: National Archives, good condition, 1 p; PUB: monthly TT means, Clayton (6), 820.

81. Charleston: 1 Dec 1788-28 Feb 1790, MISDA Jun, Nov, Dec 1789; TT: 1/100 F deg at 7 am, 2 pm, 10 pm; dd: 8-pt compass, one entry per day "prevailing"; ww: "Rain all day", "Cloudy, clear, high winds", etc, one entry per day; PUB: The Columbian Magazine or Universal Asylum, Mar, Apr, Jun, Aug, Sep, Nov 1789 and Mar 1790 issues.

82. Fulton: Jan 1818-Dec 1824; "Precipitation and Cloudiness...by J. Dryson"; RR: estimated Jan 1818-Dec 1821, measured Jan 1822-Dec 1824, with location, description of gauge, "No. Rainy d's"; N: "No. Cloudy days"; a summary MS: National Archives, fair condition, 3 pp.

VERMONT

83. Bennington: Mar 1805-Oct 1837; Benjamin Harwood; "... in most cases (the diary) gives an account of the weather each day. On many days, the diary gives the range of temperatures during the day."; MS: Bennington Museum.

84. Middlebury: 1 Feb-31 Mar 1812, 1 Jan-30 Jun 1813, 1 Nov 1813-31 Dec 1814; Frederick Hall; Middlebury College; TT: usually whole F deg at 7 am, noon, 9 pm, with mean for day; dd: 16-pt compass, one entry per day 1 Feb - 31 May 1812; ww: one entry per day, "Fine weather", "Snowed most of the day", "Cloudy-snowed", etc. 1 Feb-31 Mar 1812; ww: summary of 1816 with highest, lowest, and monthly TT means; PUB: The Literary and Philosophical Repertory, 1812-1817, 1, 138-139, 165-166, 393-395, 476, 2, 78-80, 316-318, 396-398, 484.

85. Rutland: Jan-Dec 1789; Samuel Williams (see Cambridge, Mass.); TT: 1/2 F deg means; RR: 1/1000 inch totals; dd: 8-pt compass, number of obs per month; ww: number of obs for year under "fair", "Cloudy", "Rain", "Snow", "Hail", "Fog", "Thunder", "Aur. Bor."; PUB: Williams (24) 47, 49, 51, 56; monthly RR totals, Goodnough (9), 317.

VIRGINIA

86. Charlottesville (Philadelphia, Pa., Washington, D.C. and elsewhere): 1772-1820; Thomas

Jefferson; Charlottesville obs taken at Monticello; "The weather notebooks increased in complexity until the routine entries included the reading of the thermometer and barometer; hour of readings; direction of wind; velocity; weather...Saussure's hygrometer..."; 1772-1777 obs simultaneous with James Madison, Williamsburg, Va.; MS: Weather Memorandum Book, 1776-1820 (includes compilations from 1772), Library of Congress, 48 pp; 1785-1786 (1784-1794 Library of the University of Virginia dates), Massachusetts Historical Society, 24 pp; 1802-1816 (compilations from 1784), Massachusetts Historical Society, 87 pp; quotation and information given above taken from anonymous typescript at Library of Virginia, where photostatic copies of original MSS are available; PUB: TT, RR, dd abstracts, Jan 1810-Dec 1816, Betts (2), 622-628.

87. Williamsburg: 1 Jul 1777-17 Aug 1778; James Madison; William and Mary College; TT: whole F deg at "8H.", "12H.", "3H." or "4H."; ppp: 1/100 inch at "eight o'clock"; dd: 16-pt compass at time of ppp obs; ww: "Cloudy", "Rainy", "Clear", etc. at time of ppp obs, occasionally in more detail; PUB: Trans. Amer. phil. Soc., 1786, 2 (o.s.), 141-158.

88. Williamsburg: 1784-1793; James Madison; "Meteorological journal ... at his plantation"; MS: American Philosophical Society.

5. Conclusions

The accessibility of research of these records, stored in so many depositories throughout the East, is in itself a major problem.. Although one purpose of the foregoing list is to acquaint the researcher with available material, it is frequently financially prohibitive for the individual to secure copies of needed records.

By the very nature of its content, this bibliography carries no pretense of exhaustive completeness. However, it is hoped that the material presented will encourage more extensive and active research on our early meteorological records, and that it will somewhat simplify the early stages of such research.

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Hertfordshire, England
1 December 1957

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